Remarks

The present amendment responds to the Official Action dated April 20, 2004. The Official Action allowed claims 20 and 22. The Official Action rejected claims 1-9, 23, 27 and 33 under 35 U.S.C. 102(e) based on Ladd U.S. Patent No. 6,493,673 ("Ladd"). The Official Action rejected claims 10-13 under 35 U.S.C. 103(a) as unpatentable over Ladd. The Official Action rejected claim 21 under 35 U.S.C. 103(a) as unpatentable over Tanenblatt U.S. Patent No. 6,006,187 ("Tanenblatt") in view of Baba U.S. Patent No. 6,397,183 ("Baba"). The Official Action objected to claims 14-19, 24, 28, 31, 32 and 34 as dependent on rejected base claims, but stated that these claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. These grounds of rejection are addressed below following a brief discussion of the present invention to provide context. Claims 25, 26, 29 and 30 have been canceled. Claims 1, 21 and 23 have been amended to be more clear and distinct. Claims 1-24, 27, 28 and 31-34 are presently pending.

The Present Invention

A system according to an aspect of the present invention includes the generation and processing of a set of tags which can be used to model phenomena. A set of tags can be developed to represent characteristics of specific phenomena, and the tags may be placed in a set of instructions for modeling phenomena in order to specify desired characteristics of the phenomena. The tags may suitably be generated by analyzing instances of actual phenomena in order to identify characteristics exhibited by the phenomena, and creating a set of tags defining

the identified characteristics. For example, a set of tags may be developed to specify prosodic characteristics similar to those of the speech of a particular speaker. These tags may be applied to text at suitable locations within the text and may define prosodic characteristics of speech to be generated by processing the text. The set of tags defines prosodic characteristics in sufficient detail that processing of the tags along with the text can accurately model speech having the prosodic characteristics of the original speech from which the tags were developed.

A set of tags can be defined by training, for example, by identifying a corpus of training text as read by a particular speaker to identify prosodic characteristics of speech of that speaker. Tags can be defined using the identified characteristics. Once tags have been generated, they may be entered into a body of text for which text to speech conversion is desired. Tags may be placed using an editor, for example, or may be placed automatically according to a programmed set of rules. Once a body of text has been developed with a set of tags, the tags are processed to generate speech having characteristics defined by the tags. The speech may be played using a voice synthesizer.

The Art Rejections

All of the art rejections hinge on the application of Ladd, standing alone or Tanenblatt and Baba standing in combination. As addressed in greater detail below, Ladd, Tanenblatt and Baba do not support the Official Action's reading of them and the rejections based thereupon should be reconsidered and withdrawn. Further, the Applicant does not acquiesce in the analysis of Ladd, Tanenblatt and Baba made by the Official Action and respectfully traverses the Official Action's analysis underlying its rejections.

The Official Action rejected claims 1-9, 23, 27 and 33 under 35 U.S.C. 102(e) as unpatentable over Ladd. In light of the present amendments to claims 1 and 23, this ground of rejection is respectfully traversed.

Claim 1, as amended, claims analyzing one or more instances of actual phenomena to identify characteristics of the instances of the actual phenomena and creating a set of tags defining the identified characteristics of the one or more instances of the actual phenomena, each tag controlling one or more aspects of one or more modeled phenomena to be produced in response to the tags, the tags controlling the aspects of the modeled phenomena so as to create characteristics in the modeled phenomena similar to those exhibited by the one or more instances of the actual phenomena. These features are not taught by Ladd. Ladd teaches the use of tags to control various aspects of an interaction, including prosody of synthesized speech. However, Ladd does not teach analyzing one or more instances of actual phenomena to identify characteristics of the instances of the actual phenomena and creating a set of tags defining the identified characteristics of the one or more instances of the actual phenomena. Moreover, Ladd does not teach that the tags control aspects of modeled phenomena to be produced in response to the tags, with the tags controlling the aspects of the modeled phenomena so as to create characteristics in the modeled phenomena similar to those exhibited by the one or more instances of the actual phenomena. Ladd describes the use of a markup language, and essentially teaches the use of tags to mark text and commands so that the text, and the actions taken in response to commands, will have the desired characteristics. Ladd teaches a prosody element of a markup language allowing a user to control various aspects of content presented to a user. Attributes to

be controlled include rate, volume, pitch and range. The attributes can be set using numerical values which are included in tags. See Ladd, col. 34, lines 34-58. Ladd does not suggest analyzing instances of actual phenomena to generate tags that can produce modeled phenomena similar to the actual phenomena, and does not present or suggest any mechanism for doing so. Using actual phenomena to generate tags, and using the tags to produce phenomena having characteristics similar to those of the actual phenomena, as is claimed by claim 1, presents a very powerful and simple way of modeling phenomena. Tags generated through an analysis of actual phenomena can be expected to produce a natural effect. For example, in text to speech conversion, analysis of a training corpus of actual speech to produce tags can be expected to generate a set of tags that can be used to model speech that will have a relatively natural sound. In addition, generating tags through analysis of actual phenomena can be expected to be much simpler than generating tags through direct intervention by a user. If a user chooses the characteristics defined by tags, the user may be expected to do considerable experimentation in order to achieve a desired effect. For example, if a set of tags were to be used in text to speech conversion, the user might create tags specifying particular values for pitch or volume, place the tags in a body of text, produce a text to speech conversion of the text and then play the speech. The user would then make modifications, repeat the conversion and replay the speech, repeating the process until the desired characteristics were produced. Much less, if any, such experimentation will be required when actual phenomena are used to produce tags defining characteristics of the actual phenomena, and those tags are used to produce modeled phenomena,

as is accomplished by the invention as claimed by claim 1. Claim 1, as amended, therefore defines over the cited art and should be allowed.

Claim 23, as amended, claims a prosody tag generation component to analyze a training corpus to identify characteristics exhibited by one or more readings of text by one or more target speakers and to generate a set of tags defining the identified characteristics, a text input interface for receiving a text input and a speech modeler operative to process the text input to produce speech having the prosodic characteristics specified by the tags, such that the speech produced by the speech modeler is similar to that of the one or more target speakers. As noted above with respect to claim 1, Ladd does not teach analyzing an instance of an actual phenomenon, such as a training corpus, to identify characteristics of the phenomenon, such as characteristics of a reading of text by a target speaker, in order to generate a set of tags defining the identified characteristics, and does not teach producing a modeled phenomenon, such as speech, having characteristics specified by the tags, with the modeled phenomenon having characteristics similar to those of the actual phenomenon. Claim 23, as amended, therefore defines over the cited art and should be allowed.

The Official Action rejected claim 21 under 35 U.S.C. 103(a) as unpatentable over Tanenblatt in view of Baba. In light of the present amendment to claim 21, this ground of rejection is respectfully traversed. Claim 21, as amended, claims receiving speech representing reading of a training text by the target speaker to form a training corpus, the training corpus representing actual sounds produced by the reading of the training text by the target speaker and exhibiting prosodic characteristics of actual speech of the target speaker, analyzing the training

corpus to identify prosodic characteristics of the training corpus and creating a set of tags defining the identified prosodic characteristics of the training corpus. These features are not taught by Tanenblatt, Baba or a combination thereof.

Tanenblatt teaches a visual interface allowing a user to design speech characteristics for synthesized speech. The user is presented with a mechanism for seeing and selecting various options that are available. Once the user has made his or her choices, speech can be generated that has the selected characteristics. The user may play the speech to determine if it is satisfactory and make desired modifications. The system of Tanenblatt is very different from the invention as claimed by claim 21, which uses an analysis of a training corpus representing actual sounds produced by a reading of a training text by a target speaker in order to identify prosodic characteristics of the training corpus, and creation of a set of tags defining the identified prosodic characteristics of the training corpus. The creation of tags through analysis of an actual reading of a training corpus can be expected to produce synthesized speech having relatively natural sounding characteristics. In addition, such creation of tags can be expected to be simpler than that of Tanenblatt, which requires a user to make actual selections of desired speech characteristics.

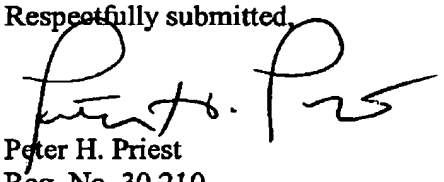
Adding Baba to Tanenblatt does not cure Tanenblatt's deficiencies as a reference with respect to claim 21, as amended. Baba teaches the use of tags to control speech characteristics of the reading of a document, but does not teach that the tags are generated through the analysis of a training corpus representing actual sounds produced by the reading of a training text by a target speaker and exhibiting prosodic characteristics of actual speech of the target speaker. Rather,

Tanenblatt teaches the use of tags including numerical values to set characteristics of speech, and the selection of desired numerical values for the tags. The generation of tags as claimed by claim 21, as amended, can be expected to produce tags that will have the effect of more closely modeling natural speech and that are simpler to generate than the tags of Baba. Claim 21, as amended, therefore defines over the cited art and should be allowed.

Conclusion

All of the presently pending claims, as amended, appearing to define over the applied references, withdrawal of the present rejection and prompt allowance are requested.

Respectfully submitted,



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